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CLUSTERS OF CONSUMER INTERESTS AND SPHERES
OF INFLUENCE OF OPINION LEADERS^{*}

David B. ^{Montgomery} ^{***} and Alvin ^{J. Silk} ^{***}

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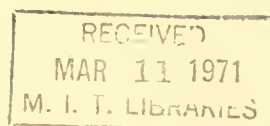
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ABSTRACT

This paper reports a test of the hypothesis suggested by King and Summers that opinion leadership overlaps between topics when interest in them also overlaps. Patterns of association in opinion leadership for sixteen topics were found to correspond to the structure of interrelationships among measures of interest in the same topics.

INTRODUCTION

In a recent JMR paper, King and Summers [9] reported finding significant amounts of overlap in self-designated opinion leadership across six product categories. They also observed that "Opinion leadership overlap is highest between product categories which involve similar interests" [9, p.49]. King and Summers do not report having measured interest directly but rather seem to have inferred it from the apparent similarity or dissimilarity of the product categories studied. This paper presents the results of a more direct investigation of King and Summers' hypothesis that opinion leadership will overlap where interest overlaps. More specifically, we examine the correspondence between patterns of association in self-designated opinion leadership for a variety of topics and the patterns of interrelationships among measures of women's interest in the same areas. In an earlier paper [11], we presented some preliminary results of a similar analysis for seven of the categories. Here, we extend the analysis to cover sixteen categories of consumer spending and related activities and cross-validate our findings via the split-sample technique.

Previous investigations of the question of whether the sphere of influence of opinion leaders encompasses a broad range of topics or instead, is more limited, have produced conflicting results.¹ The notion that overlap in opinion leadership parallels overlap in interest is an important one because it suggests a basis for delineating the realm of activities over which one might expect to find substantial numbers of "generalized" opinion leaders. A similar conjecture was made by DeFleur some time ago when he noted that "It may well be that influencing ability can be readily extended from one subject matter to another where those subject matters are essentially similar, but such attempts at generality may prove more diffi-

cult in unlike contexts of ideas" [4, p.268]. Such a view is consistent with other pieces of evidence from research on interpersonal influence. Opinion leaders have consistently been found to be more interested in the areas where they exert influence than non-leaders.² However, Katz and Lazarsfeld suggest that personal influence is not simply a flow from highly interested persons to less interested ones but more a matter of communication among people with shared or approximately equal interest levels [8, pp.325-327]. Finally, the conclusion that has emerged from social psychological research on leadership in small groups is that while leadership is not a phenomenon which manifests itself as a highly general factor, neither is it entirely situation-specific. In studies of experimental groups it has been found that leadership can be more general than specific across certain sets of tasks but not others.³

METHOD

The data analyzed here were collected as part of a larger study of media attitudes and habits [1]. Women who were members of the Market Research Corporation of America's national consumer panel were asked to respond to a mail questionnaire which included items dealing with interest and opinion leadership for the sixteen topical categories listed in Table 1.

(INSERT TABLE 1 ABOUT HERE)

The questions used to measure interest and opinion leadership in these areas were worded in the following manner:⁴

Compared with most other women you know, how actively interested would you say you are in this topic?

CHECK ONE

I am AS interested
I am LESS interested
I am MORE interested

Compared with most other women you know, how likely are you to be asked for your ideas or your advice on this topic?

CHECK ONE

I am AS likely
I am LESS likely
I am MORE likely

The second of the above questions is one of the two items originally used by Katz and Lazarsfeld to identify opinion leaders in their well-known study of personal influence [8]. It has been frequently used in subsequent investigations and is included in the six-item self-designating opinion leadership scale developed by Rogers and Cartano [13], a modified version of which was employed by King and Summers in their study [9] referred to earlier.

The size of the total sample for which these data were available was 3,837. In the work reported here, the total sample was split into "estimating" and "validating" sub-samples which are referred to as "Sample I" ($N_1 = 1,918$) and "Sample II" ($N_2 = 1,919$), respectively.

RESULTS

Interest and Opinion Leadership Intercorrelations

The notion that opinion leadership overlaps where interest does implies that the stronger the correlation in consumers' interest between topics, the greater the amount of overlap or association that should be found in opinion leadership between the same pair of areas. To provide a basis for investigating such a relationship, a matrix of intercorrelations among

the sixteen categories listed in Table 1 was obtained for the interest measures and another for the opinion leadership data. Given that interest and opinion leadership were measured on three point ordinal scales, Goodman and Kruskal's "gamma" statistic [6] was used as the measure of association. All possible pairwise associations were calculated for the sixteen categories resulting in a total of one hundred and twenty gammas for the interest data and an equal number for opinion leadership. The gammas were all found to be positive, ranging from .046 to .803 for interest and from .088 to .825 for opinion leadership in Sample I. Opinion leadership tended to be more highly intercorrelated than interest--the mean interest and opinion leadership gammas being .312 and .407, respectively.

In order to obtain a summary description of the relationship between overlap in interest and overlap in opinion leadership, the opinion leadership gammas were regressed on the interest gammas for the same pairs of categories. The following regression equation was estimated from the gammas calculated for Sample I:

$$\gamma[OL(ij)] = .165 + .794\gamma [IN(ij)]$$

$$R^2 = .780 \quad N = 120 = \text{number of } ij \text{ pairs}$$

where $\gamma[OL(ij)]$ is the value of gamma summarizing the association in opinion leadership between categories i and j and $\gamma[IN(ij)]$ is the corresponding gamma for interest. The above regression results indicate that there is a strong positive relationship between overlap in interest and overlap in opinion leadership for pairs of categories. To check on the reliability of this relationship, the above regression parameters (estimated with data from Sample I) were used along with the gammas observed for interest in Sample II to generate estimated values of gammas for opinion leadership in

Sample II. The latter were then compared with the observed opinion leadership gammas for Sample II by regressing the estimated values on the observed ones. This regression yielded an R^2 of .685 signifying that the opinion leadership gammas estimated in this fashion correspond closely to the observed values. Thus, it would appear from this split-sample analysis that there is a marked and consistent relationship between the extent of pairwise overlap in interest and that in opinion leadership.

Cluster Analysis

The preceding analysis revealed that for pairs of topical categories, the tendency for opinion leadership to be intercorrelated varies directly with the magnitude of association in interest. We consider next whether there are subsets of topics containing more than just two categories for which both interest and opinion leadership are highly intercorrelated. As a means of investigating the structure of women's interests, the interest intercorrelations were cluster analyzed. A separate cluster analysis was also performed on the opinion leadership gammas and the cluster structures for interest and opinion leadership compared. If opinion leadership overlaps across a set of topics that constitute a common interest domain, then the manner in which the sixteen categories cluster together in terms of interest should be similar to the cluster patterns obtained for opinion leadership. As before, this analysis was repeated for both halves of the sample.

The gamma matrices were cluster analyzed with the hierarchical grouping programs developed by Johnson [7], which he refers to

the "diameter" or "maximum" method. It is identical to the "replacement" version of "hierarchical syndrome analysis" which McQuitty proposed some

years ago as a paper and pencil method for classifying persons or objects into types based on common characteristics [10]. As used here, the aim is to separate the sixteen categories into smaller groups or clusters so that the categories within a cluster will be highly intercorrelated while categories or variables in different clusters will be less highly correlated.

At the outset, each variable is treated as a cluster unto itself. The initial step is to scan the matrix of associations and pick out the largest gamma. The pair of categories so identified as being most highly intercorrelated become the first cluster which is then treated as a single (new) variable. Associations between the cluster and the remaining variables replace the corresponding values for the two original variables in the correlation matrix. The association between two clusters is set equal to the value of the smallest association between any pair of variables contained in the clusters. At each step a new cluster is formed by merging previous clusters or unclustered variables and the size of the correlation matrix is reduced by a row and column. After a new cluster has been formed and the revised matrix of associations determined, the above process is repeated. Thus, two clusters are united if the minimum value of the associations between all possible pairs of variables within it is greater than the association between any other two variables or clusters in the correlation matrix. Note that the method requires that the measure of association have only ordinal properties. For the cluster that emerges at each stage, the minimum pairwise association among the variables comprising it is noted. This value represents an index of the minimum level of homogeneity or internal consistency within the cluster. Once a variable enters a cluster it remains there and cannot merge with other variables or clusters unless the entire cluster does so. The process is continued until in the last step all the original variables

are combined into a single group. The minimum pairwise correlation within it is obviously the smallest association in the original correlation matrix. Starting with K variables, they are merged into a single cluster after K-1 steps.

(INSERT TABLE 2 HERE)

Table 2 shows the composition of the clusters formed at each step along with the minimum pairwise association between variables included in them. In examining the results shown in Table 2, our principal interest is in the question of whether the cluster structures of the sixteen categories are similar for interest and opinion leadership and if so, whether the similarity appears reliable in that it is maintained in both halves of the sample. Formal methods of comparing cluster analysis results from separate samples have not been developed. Hence, we must rely on a simple ad hoc inspection. Comparing the results shown in Table 2 for Sample I, we find that the clusters formed in the first eight steps are almost identical for the interest and opinion leadership data. At the end of the eighth step, we have two three category clusters, BPH (buying food, preparing food, and household work) and CME (clothing, home furnishings, and entertaining), and a pair of two category clusters, SM (science and culture) and TA (travel and automobiles), which are the same for both the interest and opinion leadership analyses. Note that the order in which these clusters emerge is very similar in both analyses and the minimum gamma values at the eighth step when the CME clusters form are still quite large (.412 for interest and .492 for opinion leadership). As well, the same two categories, raising children (R) and hobbies (L) remain unclustered at this stage in both analyses. The discrepancy between the two sets of results for the first eight steps is

a relatively minor one. For both interest and opinion leadership, "conversation" (K) and "getting along with others" (O) join together (KO) at an early stage. In the opinion leadership data, they combine with "finances" (F) at step five and at step nine the three (KOF) are joined by "health" (X) to form the four category cluster, KOFX. Turning to the interest results, we see that health and finances come together (FX) at step five but a separate KOFX cluster does not develop as it did in the case of the opinion leadership data.

Inspecting the results shown in Table 2 further, we find that after step eight, the close correspondence between the structure of the interest and opinion leadership clusters breaks down. Beyond this point clusters containing four or more categories begin to develop. In the case of the interest data, the larger clusters that evolve in the latter half of the analysis possess rather low levels of internal consistency and hence the meaningfulness of these higher order groupings becomes questionable. There are no rigid criteria for establishing a cutoff value for the minimum pairwise association that must exist among a set of variables in order for them to constitute a viable cluster. However, keeping in mind that the magnitude of gamma indicates how much more probable it is to get like rather than unlike orders in two variables when two individuals are chosen at random from the sample, note that the minimum gamma value for the interest clusters formed after step nine drops below .3.

The larger groupings of the categories formed in the later stages of the opinion leadership analysis exhibit more internal consistency than do the comparable interest clusters--a reflection of the fact that the opinion leadership responses are, in general, more highly intercorrelated than the interest measures. The major difference between the interest and opinion leadership groupings that appear after step eight centers around the two principal clusters formed prior to that stage, BPH (buying and preparing

food and household work) and CME (clothing, furnishing a home, and entertaining). With respect to opinion leadership, these two clusters unite at step nine and the resulting cluster (BPHCME) possesses a considerable degree of internal consistency as evidenced by its minimum gamma of .441. In contrast, the BPH and CME interest clusters remain separated until the very last step when the final grand cluster containing all sixteen variables is formed.

Table 2 also presents the results obtained by cluster analyzing the interest and opinion leadership intercorrelations for the second half of the sample (Sample II). The findings are essentially the same as those just discussed for Sample I. The interest and opinion leadership clusters obtained in each half of the sample are very similar in regard to their composition, the order in which they are formed, and the minimum pairwise association within each. Again in Sample II we find that the interest and opinion leadership clusters formed in the first eight steps of their respective analyses correspond quite closely to one another but after this point the patterns diverge as groupings of increasing size emerge. In short then, the cluster analysis produced consistent results for both halves of the sample.

DISCUSSION

The clusters of topics which appear to represent both domains of shared interests and spheres of general influence for opinion leaders are constituted in ways that might have been expected on a common-sense basis. That "buying" and "preparing food" and "household work" form a tight cluster (BPH) is not surprising since these are tasks central to the housewife's role. "Clothes", "home furnishing", and "entertaining" (CME) are socially visible manifestations of taste. More unexpected perhaps is the grouping of

"health" with "finances"--possibly a reflection of a general concern for personal or family security and well-being. Both the "science-culture" (SV) and the "travel-automobile" (TA) clusters involve activities external to the homemaker role. "Hobbies" (L) and "raising children" (R) remain separate categories as a result of not being strongly associated with any other set of categories.

A limitation of the present study is that interest and opinion leadership were measured by single questions worded in a similar fashion and repeated with reference to each of sixteen topics. Such a procedure may give rise to problems of response set--a tendency for responses to be affected in a systematic way by content-irrelevant factors. The basic statistic used throughout this analysis was a measure of association. Extraneous method variance shared by a set of measurements artificially inflates the level of association among them. The suspicion that the opinion leadership measures might be contaminated by some type of response set was aroused by the observation, noted earlier, that the opinion leadership data were more highly intercorrelated than the interest data. In a previous study of personal influence in food and furniture purchasing, Silk [14] found indications that irrelevant method factors affected responses to the Rogers-Cartano six item self-designating opinion leadership scale.⁵ However, there appeared to be no relationship between responses to the item used to measure opinion leadership here (which is included in the Rogers-Cartano scale) and a separate measure of a particular variety of response set, "yeasaying" or acquiescence.

Mention can be made of two pieces of evidence bearing on the issue of whether the response set problem is a serious one here. First, the mean interest and opinion leadership scores were compared for each of the sixteen topics. In all cases, the mean opinion leadership rating was less than the mean interest rating for the same topic. As a further check, the asso-

ciation between interest and opinion leadership for the same category was compared with the largest correlation that existed between interest in that category and interest in any other category. A similar comparison was made using the maximum "within opinion leadership categories" correlation. For all the categories except "buying food", the interest-opinion leadership associations exceeded both the maximum "within interest" and "within opinion leadership" correlations.

These comparisons suggest that the ability of the interest and opinion leadership items to discriminate among topics was not swamped by irrelevant response set. Clearly however, to determine the limits of opinion leaders' sphere of influence in a more rigorous fashion would require that multiple measures of opinion leadership be obtained for each topic. Methods are available [3] that could be applied to such data to distinguish between the amount of "true" correlation in opinion leadership between topics and that contributed by unwanted method factors.

CONCLUSIONS

The analysis reported here lends support to King and Summers' suggestion that opinion leadership overlaps between areas where interest also overlaps. It was shown that the magnitude of association in opinion leadership between pairs of areas covaried with the degree of intercorrelation between interest in the same areas. The hierarchical clustering of interest and opinion leadership intercorrelations indicated that, up to a point, the groupings of topics in which interest is shared resemble those for which the same persons tend to be influential--or at least so designate themselves.

TABLE 1
TOPICAL CATEGORIES AND NOTATION

Symbol	Category*	Symbol	Category*
R	RAISING CHILDREN: discipline, feeding, education, allowances, bedtime, etc.	X	HEALTH: new medicines and drugs, proper nutrition, keeping well, etc.
T	TRAVEL: where to go on vacation, interesting places to visit at home or abroad, ways of getting there (bus, train, ship, plane, automobile), etc.	L	HOBBIES: sewing, knitting, gardening or raising plants, bridge, etc.
H	HOUSEHOLD WORK: new appliances, shortcuts or improved methods of cleaning and doing other household chores, etc.	O	GETTING ALONG WITH OTHERS: making and keeping friends; how to get along with neighbors, relatives, in-laws, business associates, etc.
A	AUTOMOBILES: new car styles, foreign cars, how to maintain cars, etc.	S	SCIENCE: new developments in space travel, atomic energy, electronics, etc.
E	ENTERTAINING: how to give a successful party, proper ways of entertaining, etc.	K	CONVERSATION: learning things to talk to others about, how to be entertaining, etc.
B	BUYING FOOD: new types of food, how to find good buys, best brands, etc.	F	FINANCES: budgeting, how to save money or invest money, life insurance, etc.
P	PREPARING FOOD: recipes, menus, new ways of using food, etc.	V	CULTURE: reading books, visiting museums, going to plays and concerts, etc.
C	CLOTHES: new styles in clothing, how to shop for clothes, etc.	M	FURNISHING A HOME: how to shop for new furniture, latest styles in home furnishings, new decorating ideas, etc.

*Exact wording used in questionnaire

TABLE 2
CLUSTER ANALYSIS RESULTS FOR INTEREST AND OPINION LEADERSHIP CATEGORIES

Interest			Opinion Leadership	
Step	Cluster	Min. γ	Cluster	Min. γ
Sample I				
1	(B-P)	.803	(B-P)	.811
2	(C-M)	.661	(K-O)	.736
3	(BP-H)	.645	(C-M)	.660
4	(K-O)	.597	(BP-H)	.649
5	(X-F)	.551	(S-V)	.609
6	(S-V)	.497	(KO-F)	.570
7	(T-A)	.436	(T-A)	.510
8	(CM-E)	.412	(CM-E)	.492
9	(BPH-XF)	.404	(KOF-X)	.449
10	(KO-R)	.298	(BPH-CME)	.411
11	(BPHXF-KOR)	.266	(SV-TA)	.364
12	(SV-TA)	.243	(KOFX-SVTA)	.324
13	(CME-L)	.198	(BPHCME-R)	.306
14	(CMEL-SVTA)	.091	(KOFXSVTA-L)	.177
15	(BPHXFKOR-CMELSVTA)	.046	(BPHCMER-KOFXSVTAL)	.064
Sample II				
1	(B-P)	.777	(B-P)	.825
2	(BP-H)	.661	(K-O)	.709
3	(C-M)	.613	(BP-H)	.669
4	(K-O)	.612	(C-M)	.662
5	(X-F)	.511	(S-V)	.637
6	(S-V)	.500	(X-F)	.583
7	(CM-E)	.462	(KO-FX)	.537
8	(BPH-XF)	.398	(CM-E)	.521
9	(T-A)	.356	(T-A)	.520
10	(BPHXF-KO)	.348	(BPH-CME)	.466
11	(BPHXFKO-R)	.283	(KOFX-R)	.362
12	(CME-L)	.243	(SV-TA)	.335
13	(SV-TA)	.189	(BPHCME-L)	.334
14	(BPHXFKOR-CMEL)	.102	(BPHCMEL-KOXFR)	.171
15	(BPHXFKORCMEL-SVTA)	.005	(BPHCMELKOXF SVTA)	.088

FOOTNOTES

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¹Brief reviews of previous studies may be found in [9, 11, 12].

²See [2, pp.51-52] for a short review of some of this work.

³See, for example, the discussion in [5, especially, pp. 246-248].

⁴Peter Rossi and Elihu Katz participated in the design of the study. A detailed description of the methods employed may be found in [1].

⁵Evidence relating to the reliability and validity of self-designating measures of opinion leadership is discussed in [8, 13].

REFERENCES

1. _____, A Study of the Magazine Market: Part II, New York: Magazine Advertising Bureau, no date.
2. Johan Arndt, Word of Mouth Advertising, New York: Advertising Research Foundation, 1967.
3. Donald T. Campbell and Donald W. Fiske, "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," Psychological Bulletin, Vol. 56, No. 2 (March, 1959), 81-105.
4. Melvin L. DeFleur, "The Emergence and Functioning of Opinion Leadership: Some Conditions of Informal Influence Transmission," in Norman F. Washburne, ed., Decisions, Values, and Groups, Vol. 2, New York: Mac Millan, 1962, 257-278.
5. Cecil A. Gibb, "Leadership," in Gardner Lindzey and Elliot Aronson, eds., Handbook of Social Psychology, Vol. 4, 2nd ed., Reading, Mass: Addison-Wesley, 1969, 205-282.
6. Leo A. Goodman and William H. Kruskal, "Measures of Association for Cross Classifications," Journal of the American Statistical Association, Vol. 49, No. 268 (Dec., 1954), 732-764
7. Stephen C. Johnson, "Hierarchical Clustering Schemes," Psychometrika, Vol. 32, No. 3 (Sept., 1967), 241-254.
8. Elihu Katz and Paul F. Lazarsfeld, Personal Influence, Glencoe, Ill.: Free Press, 1954.
9. Charles W. King and John O. Summers, "Overlap of Opinion Leadership Across Consumer Product Categories," Journal of Marketing Research, Vol. 7, No. 1 (Feb., 1970), 43-50.
10. Louis L. McQuitty, "Hierarchical Syndrome Analysis," Educational and Psychological Measurement, Vol. 20, No. 2 (Summer, 1960), 293-304.
11. David B. Montgomery and Alvin J. Silk, "Patterns of Overlap in Opinion Leadership and Interest for Selected Categories of Purchasing Activity" in Philip R. McDonald, ed., Marketing Involvement in Society and the Economy, 1969 Fall Conference Proceedings, Series No. 30, Chicago: American Marketing Association, 377-386.
12. Everett M. Rogers, Diffusion of Innovations, New York: Free Press, 1962.
13. Everett M. Rogers and David G. Cartano, "Methods of Measuring Opinion Leadership," Public Opinion Quarterly, Vol. 26, No. 3 (Fall, 1962), 435-441.
14. Alvin J. Silk, "Response Set and the Measurement of Self-Designated Opinion Leadership," Public Opinion Quarterly, (forthcoming).

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